

ABSTRACT

An example method of manufacturing a semiconductor device having a capacitor includes sequentially depositing a lower metal layer, an insulating layer and an upper metal layer on a semiconductor substrate, removing a first photoresist pattern by using O₂ / N₂ plasma, and removing polymer existing on the lower metal layer by using H₂O / CF₄ plasma. According to one example, the capacitor may include a lower electrode film, the capacitor insulating film and the upper electrode film.